REMARKS

The Office Action dated September 9, 2004, and cited references have been carefully reviewed. Claim 26 has been amended to properly reference claim elements and correct the antecedent basis of claim elements. This amendment does not change the scope of the claims. Claims 1-31 remain pending and are at issue.

35 U.S.C. §103 Rejections

To establish a prima facie case of obviousness, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one skilled in the art, to modify the reference or combine teachings and not based on Applicant's disclosure. See M.P.E.P. 2142. Any proposed modification cannot render the prior art unsatisfactory for its intended purpose or change the principle of operation of a reference. There must be a reasonable expectation of success and the prior art references must teach or suggest all of the claim limitations. See M.P.E.P. 2143. Conclusory statements cannot be relied on when dealing with particular combinations of prior art and specific claims. The rationale for combining references must be put forth. *In re Lee,* 61 U.S.P.Q.2d 1430, 1433. The Examiner can satisfy the burden of showing obviousness of the combination "only by showing some objective teaching in the prior art or that knowledge generally available to one of ordinary skill in the art would lead that individual to combine the relevant teachings of the references."

The Examiner has rejected claims 1-31 under 35 U.S.C. §103(a) as being unpatentable over Ma (U.S. Patent Number 6,531,668) in view of Yao (U.S. Patent Number 5,578,976). This ground of rejection is respectfully traversed. Reconsideration of this rejection in view of the following comments is respectfully solicited.

With respect to claim 1, the Examiner states that Ma '668 teaches a micro-cantilever device (Figs. 3a, 3b of Ma) with a base section [22], a cantilever section [220] having a length and a tapered width along the length, the cantilever section connected to the base section [at 90], the tapered width a function of position along the length, but fails to teach that the cantilever has a minimum width at the base section as required by claim 1. The Examiner states that Yao teaches a tapered cantilever that has a minimum width at the base section and refers to figure 1 of Yao.

The definition of taper according to Webster's Ninth New Collegiate Dictionary is "a gradual diminution of thickness, diameter, or width in an elongated object." The definition of tapered is "to become progressively narrower or thinner toward one end."

Ma '668 teaches at column 4, line 62, to column 5, line 2, that the cantilever beam 220 is widest at the first end 222 that is fixed to electrical contact 26 by anchor 90 and narrowest at the second end 224 that adjoins a rectangular section 250. Clearly, Ma '668 teaches away from the tapered width having a minimum width proximate the base section. Therefore, Ma '668 does not teach or suggest that the tapered width have a minimum width proximate the base section.

Yao teaches a micro electromechanical RF switch that also forms a capacitor structure 26. The capacitor structure 26 includes part of a cantilever arm 20 that is square shaped where the capacitor structure is formed and then reduces via a step-function in width to a thin strip that runs from the base section to the square capacitor structure of the cantilever arm. In other words, the cantilever of Yao has a minimum width at the base that extends to along the width of the cantilever until the start of the capacitor structure is reached where the width increases in a step-function to the width of the capacitor structure and stays at that width until the end of the cantilever. Clearly, the step function increase in width is not a tapered function as claim 1 requires.

Therefore, neither Ma nor Yao, singly or in combination, teach or suggest all of the elements of claim 1. In view of the foregoing, it is respectfully requested that the Examiner withdraw the rejection of claim 1.

With respect to independent claim 26 the Examiner states that it would have been obvious to one of ordinary skill at the time the invention was made to determine the pull-in voltage formula of the cantilever depending on its geometry and refers to column 5, lines 15-21 of Ma '668 to support this statement. As previously indicated, column 5, lines 15-21 of Ma '668 teach that an advantage of single-taper cantilevered beam 220 over a solid rectangular beam as conventionally used in MEMS switches is that beam 220 has a higher resonance frequency because it has a higher effective spring-constant-to-mass ratio. No teaching or suggestion of a pull-in voltage could be found in Ma '668. It is respectfully submitted that this rejection is based on the Applicant's disclosure because the Examiner has not put forth any showing that Ma '668 or Yao '976 or any other prior art teaches or suggests the elements of claim 26. This is prohibited by M.P.E.P. 2142.

Therefore, neither Ma nor Yao, singly or in combination, teach or suggest all of the elements of claim 26. In view of the foregoing, it is respectfully requested that the Examiner withdraw the rejection of claim 26.

Claims 2- 25 depend from claim 1 and are believed to be patentable for the same reasons as claim 1. Claims 27-31 depend from claim 26 and are believed to be patentable for the same reasons put forth for claim 26. With respect to claims 2-7 and 25, the Examiner has merely stated that it would have been obvious to one of ordinary skill in the art to custom tailor the taper

function in order to adjust the resonant frequency of the beam. It is respectfully submitted that such a rejection is based on the Applicant's disclosure because the Examiner has not put forth any showing that Ma '668 or Yao '967 or any other prior art teaches or suggests the tapered functions. This is prohibited by M.P.E.P. 2142. Additionally, the Examiner has not put forth any showing that it would be obvious to one of ordinary skill in the art to custom tailor the taper function in order to adjust the resonant frequency of the beam. Furthermore, it is respectfully submitted that the statement is a conclusory statement, which is prohibited by *in re Lee*. Therefore, it is respectfully submitted that a *prima facie* case of obviousness has not been put forth by the Examiner.

With respect to claim 8, the Examiner states that Yao '976 shows a ground plane 16 below a portion of the cantilever section. The Examiner is directed to column 3, lines 15 to 19 of Yao '976 where Yao '976 teaches that a bottom electrode 16 is typically connected to ground. It is respectfully submitted that reference 16 can not be a ground plane because it is defined by Yao '976 to be an electrode. An electrode is not a ground plane.

With respect to claim 9, the Examiner states that Ma '668 shows the micro-cantilever portion has a pull-in voltage that is calculated as a function of the dimensions of the cantilever section and material properties of the cantilever section and refers to column 5, lines 15-21 of Ma '668 for support of this statement. Column 5, lines 15-21 of Ma '668 teach that an advantage of single-taper cantilevered beam 220 over a solid rectangular beam as conventionally used in MEMS switches is that beam 220 has a higher resonance frequency because it has a higher effective spring-constant-to-mass ratio. This means beam 220 can respond to higher-frequency electrostatic actuation, which allows for MEMS switch 200 to perform high-speed switching. No mention or suggestion of pull-in voltage is in column 5, lines 15-21. Ma '668 has been thoroughly reviewed and no teaching or suggestion could be found of pull-in voltage or of pull-in voltage being calculated as a function of the dimensions of the cantilever section and material properties of the cantilever section.

With respect to claims 10-16 and 28-29, the Examiner states that it would have been obvious to one having ordinary skill in the art at the time the invention was made to calculate the pull-in voltage since it was known in the art that the function controlling the cantilever pull-in voltage depends on the cantilever length, taper and material from which it is constructed. As previously indicated, Ma '668 does not teach or suggest a pull-in voltage. The Examiner has not put forth any showing that the prior art teaches or suggests the claim limitations as required by M.P.E.P. 2143. It is respectfully submitted that this rejection is based on the Applicant's disclosure because the Examiner has not put forth any showing that Ma '668 or any other prior art teaches or suggests the tapered

functions or that it is known by those skilled in the art. This is prohibited by M.P.E.P. 2142.

With respect to claims 17, 18, and 21, Yao '976 teaches an RF switch that is square or rectangular in shape and is not a tapered width cantilever type of switch as required by independent claim 1. Therefore, neither Ma '668 nor Yao '976, singly or in combination, teach or suggest all of the elements of claims 17, 18, and 21.

With respect to claim 19, the Examiner states that Ma '668 teaches a micro-cantilever device with a base section 90, a cantilever section 420 having a length and a tapered width along the length, the cantilever section connected to the base section, the tapered width a function of position along the length and a second base section 90 wherein the cantilever is attached to the second base section. It is respectfully submitted that the base sections 90 of Ma '668 are connected to the same surface and therefore cannot form a first and second base section as required by claim 19.

With respect to claim 20, the Examiner states that Yao '976 shows a ground plane 16 that is below a portion of the cantilever section. As previously indicated, the item referenced by reference numeral 16 is an electrode that is typically connected to ground. An electrode cannot form a ground plane.

With respect to claim 22, the Examiner is directed to Fig. 9c of the present invention that shows a strain relief 314. Yao '976 has been thoroughly reviewed and no teaching or suggestion of a strain relief could be found in FIG. 1 of Yao '976 or in the text of Ma '668 or in Yao '976.

With respect to claim 23, Yao '976 teaches an RF switch that is square or rectangular in shape and does not have a tapered width as required by independent claim 1. Therefore, neither Ma '668 nor Yao '976, singly or in combination, teach or suggest all of the elements of claim 23 since claim 23 depends from claim 1.

With respect to claims 26, 27, 30, and 31, the Examiner states that it would have been obvious to one of ordinary skill at the time the invention was made to determine the pull-in voltage formula of the cantilever depending on its geometry and refers to column 5, lines 15-21 of Ma '668 to support this statement. As previously indicated, column 5, lines 15-21 of Ma '668 teach that an advantage of single-taper cantilevered beam 220 over a solid rectangular beam as conventionally used in MEMS switches is that beam 220 has a higher resonance frequency because it has a higher effective spring-constant-to-mass ratio. No teaching or suggestion of a pull-in voltage could be found in Ma '668. It is respectfully submitted that this rejection is based on the Applicant's disclosure because the Examiner

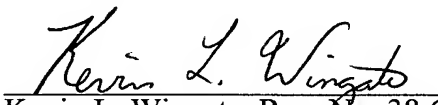
has not put forth any showing that Ma '668 or any other prior art teaches or suggests claimed limitations. This is prohibited by M.P.E.P. 2142.

In view of the foregoing, it is respectfully requested that the Examiner withdraw the rejection of claims 2-25 and 27-31.

Conclusion

The application is considered in good and proper form for allowance, and the Examiner is respectfully requested to pass this application to issue. If, in the opinion of the Examiner, a telephone conference would expedite the prosecution of the subject application, the Examiner is invited to call the undersigned attorney.

Respectfully submitted,



Kevin L. Wingate, Reg. No. 38,662
LEYDIG, VOIT & MAYER, LTD.
6815 Weaver Road, Suite 300
Rockford, Illinois 61114-8018
(815) 963-7661 (telephone)
(815) 963-7664 (facsimile)

Date: November 3, 2004